

Project Name | Library Lake SW Wetland**Date** | 12-31-2016**To / Contact info** | Jane Malischke, Alex Smith, Wisconsin DNR**Cc / Contact info** | Tom Schroeder, BDLMD President**From / Contact info** | Jay Michels (EOR), Britta Hansen (EOR)**Regarding** | Grant Completion

Project Status

EOR has completed all tasks associated with the Wisconsin DNR Large Scale Planning Surface Water Grant for the Library Lake SW Wetland Project. This memo will report the status and result of each task associated with this grant project and outline the next steps that the Beaver Dam Lake Management District should take in order to complete construction of this project.

Task 1 – Land Access and Acquisition

After much negotiation with land owners the BDLMD is close to securing ownership of the Witte parcel, at the SW corner of Hwy 48 and 5th Avenue in Cumberland. The BDLMD has also reached a verbal agreement for use of a hospital parcel south of the Witte parcel for a stormwater easement to be used for the Library Lake SW Wetland project. This agreement will be formalized after a property survey is completed for the parcel.

Task 2 – Wetland Investigation

On June 16, 2015 EOR staff performed a wetland delineation on the Witte and hospital parcels Southwest of Library Lake. A single 2.79 acre flow-through wetland was delineated on the project site. The shallow marsh community represented the largest portion of the wetland complex. The parent soil within the wetland was classified as Seelyeville and Cathro Muck, a hydric soil type. See attached Wetland Delineation Report for more information.

Task 3 – Geotechnical Investigation

Three soil borings were completed as part of the Phase 1 Environmental Assessment on the Witte Property. See Task 12 for details.

Task 4 – Utility Investigation

In Summer and Fall of 2015 EOR staff performed a utility investigation and survey of the storm sewer network along Hwy 48, adjacent to the project site. The information was utilized to create a plan to collect and deliver stormwater to the SW wetland project area, rather than to Library Lake as is the current situation. See attached map of survey data.

Task 5 – Topographic Survey

In summer 2015 EOR staff performed a topographic site survey. See attached map of survey data.

Task 6 – Watershed Analysis

EOR performed a watershed analysis to determine how much stormwater could be captured and treated at the Library Lake SW Wetland. Two subwatersheds were identified around the area:

Library Lake – 6th Street – 8.0 Acres – 72% Impervious

Library Lake – 5th Street – 7.3 Acres – 52% Impervious

In all there are just over 15 acres (average impervious of 62%) that could be disconnected and treated at the proposed SW Wetland. See attached map of subwatersheds.

Task 7 – Schematic Design

An 80% engineering plan set was created for a wetland complex with pre-treatment unit. A statement of estimated quantities (SEQ) was developed in association with this plan set. See attached plans.

Task 8 – Wetland Restoration and Invasive Species Strategy

EOR Biologists who reviewed the wetland determined that the wetland provides a unique educational opportunity given its generally high-quality nature and visibility within the City of Cumberland. While reed canary grass proliferates around the periphery of the wetland, high quality, native species including broad-leaf cattail, black willow, lake sedge, tamarack, and white cedar dominate the shrub-carr and coniferous swamp portion of the wetland. Potential restoration opportunities include prescribed fire to control reed canary grass and common buckthorn removal both within the wetland and surrounding uplands. See attached Buckthorn Fact Sheet from UW Extension for more information on buckthorn control methods. Sustaining a diverse wetland may require additional control over upland land use by maintaining a sufficient buffer to capture excess nutrients and stormwater runoff.

Task 9 – BMP Performance Modeling

P8 was used for water quality modeling. According to the model NR 151 rules will be met for TSS (84% removal) and P (55% removal). It was also determined that peak rates will actually increase to the south of the project area and Collingwood Lake, but this is justifiable in this context because historical drainage patterns included the subwatersheds that will be re-directed to the south and away from Library Lake.

Task 10 – Lake Water Quality Modeling

EOR staff created a BATHTUB model to predict the SW Wetland project's impact on Library Lake. BATHTUB predicted a 39% improvement (reduction) in in-lake TP concentration for Library Lake.

Task 11 – Coordination and Management

All work was managed in accordance with WI-DNR grant rules.

Task 12 – Phase 1 Environmental Assessment

EOR conducted a Phase 1 Environmental Site Assessment on the Witte Property in May 2016. No environmental conditions were found for the property. EOR also collected soil samples from three soil borings on site. The samples were analyzed for volatile organic compounds (VOCs), including

compounds often associated with petroleum products and solvents used by vehicle repair shops. No VOCs were detected in the samples. See attached lab report and Phase I Environmental Assessment Report.

Next Steps

The next step to completing construction of the Library Lake SW Wetland is to apply for a Land Acquisition grant from the Wisconsin DNR for the Witte property. The hospital has already agreed to give a parcel of their land in exchange for future credits toward development at the top of the watershed. The Wisconsin DNR has approved this arrangement. Formalization of this agreement will require a legal description and a survey of the property, which are currently in process. Once both of these parcels are officially obtained the BDLMD should apply for a water quality improvement grant to build the wetland complex. Some final engineering work will be required to develop the 80% plan set into 100% complete construction documents.

Proposed Project Schedule (Contingent on Funding)	
Plan Updates and Bid Package	Apr-June 2017
Bid Letting	Apr-June 2017
Award Contract	Jul-Sep 2017
Project Construction	Jul-Sep 2017
Final Planting	Oct-Dec 2017

INTRODUCTION

The City of Cumberland, Wisconsin is supporting the efforts of the Beaver Lake Dam Management District in pursuing a grant to improve water quality in Beaver Dam Lake. The grant funds will be used to create a stormwater treatment facility south of Library Lake.

Purpose of Review

The purpose of this report is to document the boundaries of wetland resources at the proposed stormwater treatment facility location south of Library Lake (Figure 1). This report has been prepared to facilitate a wetland boundary and type determination by the wetland regulatory agencies.

Review Team Qualifications and Contact Information

The wetland delineation was performed on June 16th, 2015 by Jason Naber of Emmons & Olivier Resources (EOR), Minnesota Wetland Delineation Certification #1254.

Wetland Delineators:

Jason Naber, WDC #1254

Emmons & Olivier Resources, Inc. (EOR)

651 Hale Ave N.
Oakdale, MN 55128
651-203-6028
jnaber@eorinc.com

Delineation Prepared for:

Beaver Lake Dam Management
District
1870 Hines Lakeview Drive
Cumberland, WI 54829
(715) 822-2699

Site Location and Description

The project is located in Section 7, T35N, R13W within the City of Cumberland, Barron County, Wisconsin. The Beaver Lake Dam Management District is the Local Governing Unit for the Wetland Conservation Act.

METHODOLOGY

Preliminary Investigation

Prior to conducting the field wetland delineation, existing data and available maps were compiled and reviewed. Topographic maps (Figure 2), Wisconsin Wetland Inventory (WWI) (Figure 4), and WI DNR Public Waters (Figure 5) maps were reviewed to determine likely locations of existing wetlands. NRCS SSURGO soils were compiled using the Web Soil Survey site to determine potentially hydric soils in the project area (Figure 3). Lastly, precipitation data from the United States Department of Agriculture Regional Climate Center for Cumberland, Wisconsin was reviewed to determine how current precipitation at the site compares to normal conditions (Appendix E).

Wetland Delineation Methods

The methodology of the 1987 Corps of Engineers Wetland Delineation Manual and regional supplements for the Northcentral and Northeast Region were used to delineate wetlands within the project area. The wetland delineation was conducted on June 16th, 2015. Figure 6 shows locations of sampling points.

Two wetland-upland transects were conducted on the site. Wetland observation and upland observation points were established, and the Wetland Determination Data Form – Northcentral and Northeast Region was completed. Completed field data forms are attached in Appendix C. All sample points were recorded

for map preparation using a submeter differential Global Positioning System (GPS) and transferred to ArcMap v. 10.1 Geographic Information System (GIS). Photos for the sample points are in Appendix D.

Vegetation

Two sample points were established within the wetland plant communities encountered at the site and two additional sample points within the upland plant communities. At the pit locations, all observable species were assigned scientific names to allow for wetland indicator status determination. Literature used for nomenclature and identification are listed in References. The wetland probability indicator status of dominant plant species was determined using the 2014 National Wetland Plant List v3.2.

Soils

Soil samples were collected using a trenching shovel and pits were dug to a minimum of 24 inches. Soil colors were determined using the Munsell Soil Color Charts. Primary and secondary indicators followed the Natural Resources Conservation Service Field Indicators of Hydric Soils. Soils were described to include those hydric indicators immediately below the A-horizon. The hydric soil determination was then made based upon soil pit characterization, soil order, ponding, and flooding.

Hydrology

As required in the 1987 Manual, the presence of subsurface hydrology or indicators thereof was characterized in the rooting zone. Comments are on data sheets about any absence or marginal presence of hydrology on the date of delineation and the professional judgment used to make a hydrology determination at the point.

Delineation Boundary Determination

The boundary was determined after taking into consideration the parameters of soil, hydrology, vegetation, topography, and professional judgment at paired upland and wetland sample points. Boundary point locations were field-flagged at sufficient intervals, depending on curvature.

RESULTS AND DISCUSSION

Description of Field Conditions

The delineation was performed June 16th, 2015. Weather conditions were clear at the time of the delineation and site conditions were normal. The previous three months during the growing season included one month with above normal precipitation and two months with normal precipitation totals. See Appendix E for precipitation information.

Topography within the vicinity of the project is comprised of a flow through wetland that is situated in a depression between uplands to the east and west (Figure 2) and lakes to the north (Library Lake) and south (Collingwood Lake). Vegetation within the project area is comprised of native and non-native species.

The upland soils within the project area are comprised of Chetek sandy loams on lands with two to twelve percent slope. The parent soil within the wetland is classified as Seelyeville and Cathro Muck with zero to one percent slope. Seelyeville-Cathro Muck is classified as a hydric soil (Table 1; Figure 3).

Table 1. Soils within project vicinity

Soil symbol	Soil Name	Surface texture	Depth to Water Table	Slope
Sm	Seelyeville-Cathro	Muck	0 cm	0-1%,
CkB	Chetek	Sandy Loam	>180	2-6%
CkB2	Chetek Eroding	Sandy Loam	>180	6-12%

Wetlands

A single 2.79 acre wetland complex was delineated at the project site (Figure 6). The wetland complex is comprised of three distinct communities as described below (Table 2). The shallow marsh community (wetland #1) represents the largest portion of the wetland complex. Reed Canary Grass (*Phalaris arundinacea*) and Broadleaf Cattail (*Typha latifolia*) are the dominant plant species within wetland community #1. Black Willow (*Salix nigra*) and Lake Sedge (*Carex lacustris*) are the dominant plant species within wetland community #2, while Tamarack (*Larix laricina*) and White Cedar (*Thuja occidentalis*) were the most dominant in wetland community #3. Common Buckthorn (*Rhamnus cathartica*), Box Elder (*Acer negundo*), Cottonwood (*Populus deltoides*) and Tatarian honeysuckle (*Lonicera tatarica*) were the most dominant species on the adjacent uplands.

Wetland hydrology was met through Hydrology Indicator “High Water Table (A2)” and “Saturation (A3)” at both wetland pits. Primary Indicators of wetland hydrology were not identified at either of the upland pits.

Hydric soil indicators were met within the delineated wetland basin at both wetland pits. Hydric soil was met at pit #1 through Hydric Soil Indicator “Depleted Below Dark Surface (A11)” (Figure 3). Hydric soil was met at pit #3 through Hydric Soil Indicator “Depleted Matrix (F3)”:

Table 2. Wetland Types

Wetland ID	Wetland Type		Acres Delineated
	Circular 39 / NWI	Eggers and Reed	
Wetland Community #1	Type 3 / PEMb	Shallow Marsh	1.39
Wetland Community #2	Type 6 / PSSc	Shrub-Carr	1.12
Wetland Community #3	Type7 / PFOc	Coniferous Swamp	0.28
Total area of wetland delineated			2.79

REFERENCES

- Eggers, Steve D. and D. Reed. Wetland Plants and Communities of Minnesota and Wisconsin. U.S. Army Corps of Engineers, St. Paul District. St. Paul, MN. 1997. 263pp.
- Minnesota Climatology Working Group. Wetland Delineation Monthly Precipitation Data from Gridded Database. http://climate.umn.edu/gridded_data/precip/wetland/wetland.asp
- Ownbey, Gerald B. and T. Morley. Vascular Plants of Minnesota: A Checklist and Atlas. University of Minnesota Press, Minneapolis MN. 1991. 306pp.
- Tiner, R.W. 2003. Dichotomous Keys and Mapping Codes for Wetland Landscape Position, Landform, Water Flow Path, and Waterbody Type Descriptors. U.S. Fish and Wildlife Service, National Wetlands Inventory Program, Northeast Region, Hadley, MA. 44 pp.

Library Lake
Wetland Delineation Report

- USDA, NRCS. 2003. Field Indicators of Hydric Soils in the United States, Version 5.01. G.W. Hurt, P.M. White, and R.F. Pringle (eds). USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils, Fort Worth, TX.
- USACE. 2014. National Wetlands Plant List v3.2. <http://rsgisias.crrel.usace.army.mil/NWPL/>
- USACE. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral – Northeast Region (Version 2.0)

APPENDIX A: WETLAND PLANT INDICATOR CLASSES

Obligate Wetland (OBL)	Species occurs almost always (estimated probability >99%) in wetlands under natural conditions.
Facultative Wetland (FACW)	Species usually occurs in wetlands (estimated probability 67 to 99%) but occasionally found in non-wetlands.
Facultative (FAC)	Species equally likely to occur in wetlands and non-wetlands (estimated probability 34 to 66%).
Facultative Upland (FACU)	Species usually occurs in non-wetlands (estimated probability 67 to 99%) but occasionally is found in wetlands (estimated probability 1 to 33%).
Obligate Upland (UPL)	Species occurs in wetlands in other region but, under normal conditions, occur almost always (estimated probability >99%) in non-wetlands within the region specified. Species that do not occur in wetlands in any region are not found on the National List.
No Indicator Status (NI)	Insufficient information available to establish indicator status.

APPENDIX B: FIGURES

Figure 1. Site location



Library Lake
Stormwater Facility Project
Field Map



Figure 2. Topography



Library Lake
Wetland Delineation Report

Figure 3. Soils



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Legend	
●	Upland
●	Wetland
 	Wetland Delineation
 	CkC/Chetek sandy loam, 2 to 6 percent slopes
 	CkC2/Chetek sandy loam, 6 to 12 percent slopes, eroded
 	HaC/Haugen sandy loam, 6 to 12 percent slopes
 	WnB/Henrys loamy sand, 2 to 6 percent slopes
 	Sm/Seelyville and Catro mucks, 0 to 1 percent slopes
 	W/Water



Library Lake
Stormwater Facility Project
Field Map



Figure 4. Wisconsin Wetlands Inventory



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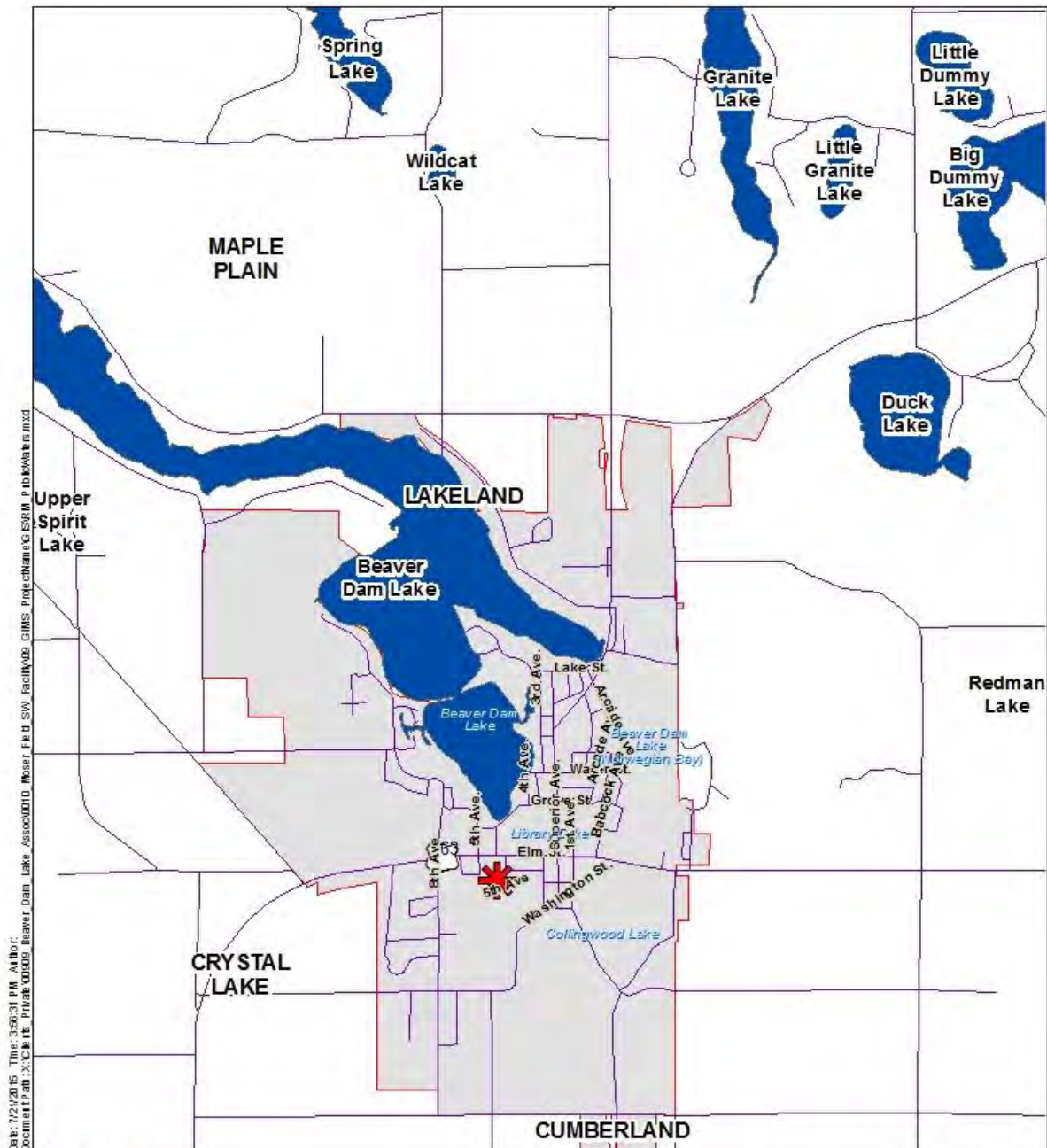
Legend	
	Delineated Wetland
	PARCELS
WI DNR Wetland Inventory	
	Aquatic bed
	Emergent/wet meadow
	Emergent/wet meadow, Aquatic bed
	Emergent/wet meadow, Open Water
	Forested, Emergent/wet meadow
	Open Water
	Scrub/shrub
	Scrub/shrub, Emergent/wet meadow



**Library Lake
Stormwater Facility Project
Field Map**



Figure 5. WI DNR Protected Waters



- Legend**
- Library Lake Site
 - Wisconsin DNR Public Waters
 - Cumberland City Boundary

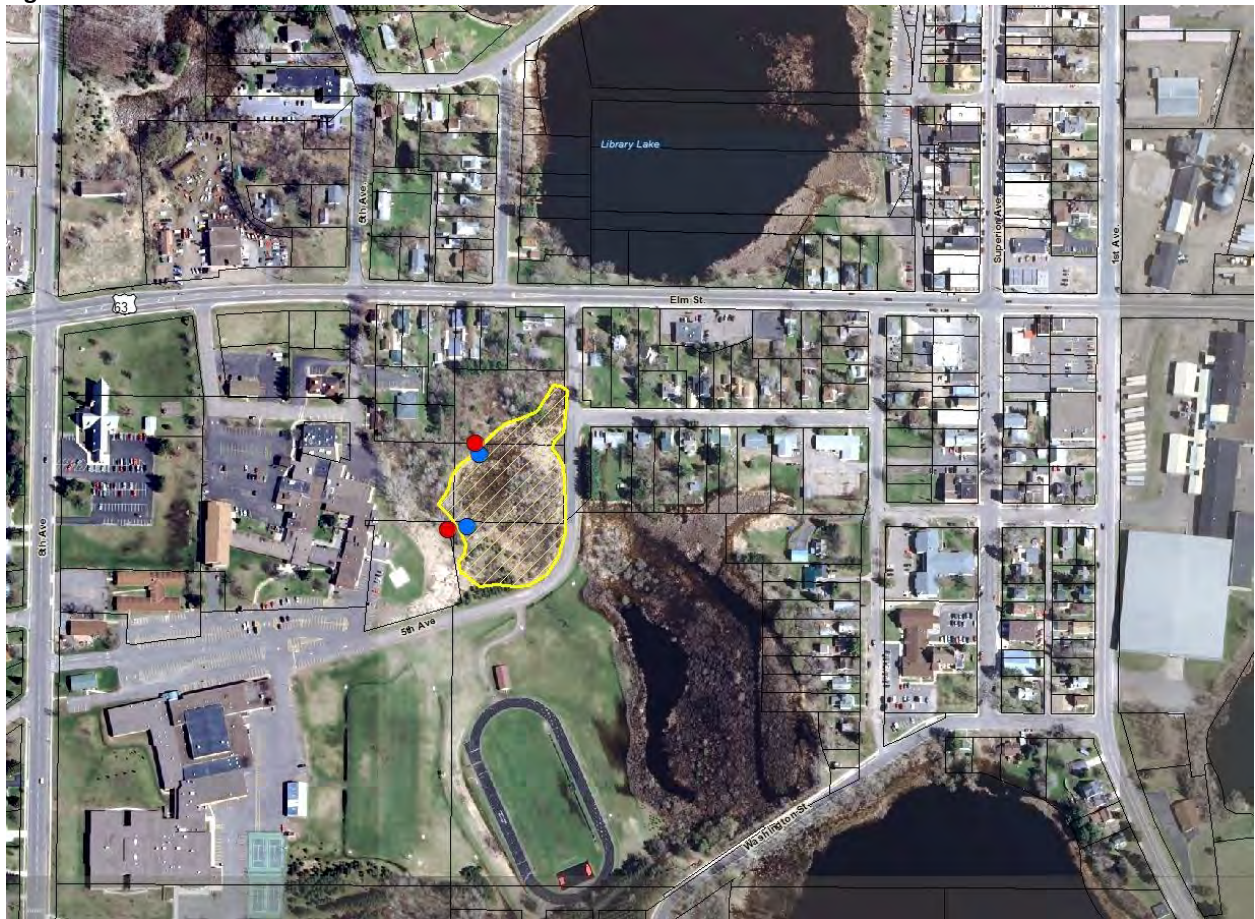


**Moser Field
Stormwater Facility Project
Field Map**

Feet
0 100 200 300 400 500 600 700 800 900 1000

Library Lake
Wetland Delineation Report

Figure 6. Delineated Wetland



APPENDIX C: WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Witte Wetland/Library Lake City/County: Cumberland/Barron Sampling Date: 6/16/2015
 Applicant/Owner: Beaver Dam Lake Management District State: Wisconsin Sampling Point: T1P2
 Investigator(s): Jason Naber, Mike Majeski Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____
 Slope (%): _____ Lat.: _____ Long.: _____ Datum: _____
 Soil Map Unit Name: _____ NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? _____ (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? _____
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>N</u>
Hydric soil present? <u>N</u>	
Indicators of wetland hydrology present? <u>N</u>	
If yes, optional wetland site ID: _____	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes _____ No _____ Depth (inches): _____ Water table present? Yes _____ No _____ Depth (inches): _____ Saturation present? Yes _____ No _____ Depth (inches): _____ (includes capillary fringe)	Indicators of wetland hydrology present? <u>N</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

SOIL

Sampling Point: T1P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	10YR 3/2	100					Loam	
2-6	10YR 4/3	100					Sandy Loam	
6-12	10YR 4/2	100					Silt	Thin Layers
12-22	10YR 4/4	100					Sand	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains
**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils:	
<input type="checkbox"/> Histisol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B)	<input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B)	<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)	<input type="checkbox"/> Dark Surface (S7) (LRR K, L)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L)	<input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L)	<input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B)	<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			
<input type="checkbox"/> Sandy Redox (S5)			
<input type="checkbox"/> Stripped Matrix (S6)			
<input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B)			

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric soil present? <u> N </u>
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Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Witte Wetland/Library Lake City/County: Cumberland / Barro Sampling Date: 6/16/2015
 Applicant/Owner: Beaver Dam Lake Management District State: Wisconsin Sampling Point: T2P4
 Investigator(s): Jason Naber, Mike Majeski Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____
 Slope (%): _____ Lat.: -92.026 Long.: 45.531 Datum: _____
 Soil Map Unit Name _____ NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? _____ (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? _____
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>N</u>
Hydric soil present? <u>N</u>	
Indicators of wetland hydrology present? <u>N</u>	
If yes, optional wetland site ID: _____	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes _____ No _____ Depth (inches): _____ Water table present? Yes _____ No _____ Depth (inches): _____ Saturation present? Yes _____ No _____ Depth (inches): _____ (includes capillary fringe)	Indicators of wetland hydrology present? <u>N</u>	
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants

Sampling Point: T2P4

VEGETATION - Use scientific names of plants					Sampling Point: T2P4		
Tree Stratum		Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status	50/20 Thresholds	
1	<i>Acer negundo</i>		80	Y	FAC	Tree Stratum	20% 50%
2	<i>Populus tremuloides</i>		20	N	FAC	Sapling/Shrub Stratum	11 28
3	<i>Pinus strobus</i>		5	N	FACU	Herb Stratum	22 54
4						Woody Vine Stratum	0 0
5						Dominance Test Worksheet	
6						Number of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A)	
7						Total Number of Dominant Species Across all Strata: <u>4</u> (B)	
8						Percent of Dominant Species that are OBL, FACW, or FAC: <u>75.00%</u> (A/B)	
9						Prevalence Index Worksheet	
10			105		= Total Cover	Total % Cover of:	
						OBL species <u>0</u> x 1 = <u>0</u>	
						FACW species <u>1</u> x 2 = <u>2</u>	
						FAC species <u>210</u> x 3 = <u>630</u>	
						FACU species <u>51</u> x 4 = <u>204</u>	
						UPL species <u>5</u> x 5 = <u>25</u>	
						Column totals <u>267</u> (A) <u>861</u> (B)	
						Prevalence Index = B/A = <u>3.22</u>	
Sapling/Shrub Stratum		Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators:	
1	<i>Rhamnus cathartica</i>		30	Y	FAC	<input type="checkbox"/> Rapid test for hydrophytic vegetation	
2	<i>Lonicera tatarica</i>		20	Y	FACU	<input checked="" type="checkbox"/> Dominance test is >50%	
3	<i>Picea glauca</i>		5	N	FACU	<input type="checkbox"/> Prevalence index is ≤3.0*	
4						Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)	
5						<input type="checkbox"/> Problematic hydrophytic vegetation* (explain)	
6						*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
7						Definitions of Vegetation Strata:	
8						Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.	
9						Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.	
10						Herb - All herbaceous (non woody) plants, regardless of size, and woody plants less than 3.28 ft tall	
11						Woody vines - All woody vines greater than 3.28 ft in height	
12						Hydrophytic vegetation present? <u>Y</u>	
13							
14							
15			55		= Total Cover		
Herb Stratum		Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status		
1	<i>Rhamnus cathartica</i>		80	Y	FAC		
2	<i>Lonicera tatarica</i>		20	N	FACU		
3	<i>Carex albicans</i>		5	N	UPL		
4	<i>Solidago flexicaulis</i>		1	N	FACU		
5	<i>Ulmus americana</i>		1	N	FACW		
6			1	N			
7							
8							
9							
10							
11							
12							
13							
14							
15			108		= Total Cover		
Woody Vine Stratum		Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status		
1							
2							
3							
4							
5							
			0		= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Witte Wetland/Library Lake City/County: Cumberland/Barron Sampling Date: 06/16/2015
 Applicant/Owner: Beaver Dam Lake Management District State: Wisconsin Sampling Point: T1P1 Wetland
 Investigator(s): Jason Naber, Mike Majeski Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____
 Slope (%): _____ Lat.: -92.026 Long.: 45.531 Datum: _____
 Soil Map Unit Name _____ NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? _____ (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? _____
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>Y</u>
Hydric soil present? <u>Y</u>	
Indicators of wetland hydrology present? <u>Y</u>	
If yes, optional wetland site ID: _____	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes _____ No <u>X</u> Depth (inches): _____ Water table present? Yes <u>X</u> No _____ Depth (inches): <u>11</u> Saturation present? Yes <u>X</u> No _____ Depth (inches): <u>0</u> (includes capillary fringe)	Indicators of wetland hydrology present? <u>Y</u>	
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants

Sampling Point: T1P1 Wetland

VEGETATION - Use scientific names of plants					50/20 Thresholds		
Tree Stratum	Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status	Tree Stratum	20%	50%
1	<i>populus deltoides</i>	15	Y	FAC	Sapling/Shrub Stratum	6	15
2	<i>Ulmus americana</i>	10	Y	FACW	Herb Stratum	19	48
3	<i>Fraxinus pennsylvanica</i>	10	Y	FACW	Woody Vine Stratum	1	3
4	<i>Salix nigra</i>	5	N	OBL			
5							
6							
7							
8							
9							
10							
		40	= Total Cover				
Sapling/Shrub Stratum	Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet		
1	<i>Salix nigra</i>	15	Y	OBL	Number of Dominant Species that are OBL, FACW, or FAC:	6	(A)
2	<i>Rhamnus cathartica</i>	5	N	FAC	Total Number of Dominant Species Across all Strata:	6	(B)
3	<i>Lonicera tatarica</i>	5	N	FACU	Percent of Dominant Species that are OBL, FACW, or FAC:	100.00%	(A/B)
4	<i>Viburnum opulus</i>	5	N	FACW			
5							
6							
7							
8							
9							
10							
		30	= Total Cover				
Herb Stratum	Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status	Prevalence Index Worksheet		
1	<i>carex lacustris</i>	80	Y	OBL	Total % Cover of:		
2	<i>impatiens capensis</i>	10	N	FACW	OBL species	105 x 1 =	105
3	<i>Lysimachia terrestris</i>	5	N	OBL	FACW species	35 x 2 =	70
4					FAC species	25 x 3 =	75
5					FACU species	5 x 4 =	20
6					UPL species	0 x 5 =	0
7					Column totals	170 (A)	270 (B)
8					Prevalence Index = B/A =	1.59	
9							
10							
11							
12							
13							
14							
15							
		95	= Total Cover				
Woody Vine Stratum	Plot Size ()	Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators:		
1	<i>Vitis riparia</i>	5	Y	FAC	Rapid test for hydrophytic vegetation		
2					<input checked="" type="checkbox"/> Dominance test is >50%		
3					<input checked="" type="checkbox"/> Prevalence index is ≤3.0*		
4					Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)		
5					Problematic hydrophytic vegetation* (explain)		
		5	= Total Cover		*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic		
					Definitions of Vegetation Strata:		
					Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.		
					Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.		
					Herb - All herbaceous (non woody) plants, regardless of size, and woody plants less than 3.28 ft tall.		
					Woody vines - All woody vines greater than 3.28 ft in height.		
					Hydrophytic vegetation present? <u>Y</u>		

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: T1P1 Wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-3	10YR 2/1	100					Silt loam	
3-10	10YR 6/2	60	7.5YR 5/8	40	C	M	Loam	
10-24	10YR 6/2	50	7.5YR 5/8	50	C	M	Sand-silt	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- Coast Prairie Redox (A16) (LRR K, L, R)
- 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Witte Wetland/Library Lake City/County: Cumberland/Barron Sampling Date: 06/16/2015
 Applicant/Owner: Beaver Dam Lake Management District State: Wisconsin Sampling Point: T2P1 Wetland
 Investigator(s): Jason Naber, Mike Majeski Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____
 Slope (%): _____ Lat.: -92.026 Long.: 45.531 Datum: _____
 Soil Map Unit Name _____ NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? _____ (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? circumstances" present? _____
 (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>Y</u>
Hydric soil present? <u>Y</u>	
Indicators of wetland hydrology present? <u>Y</u>	
If yes, optional wetland site ID: _____	
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes _____ No <u>X</u> Depth (inches): _____ Water table present? Yes <u>X</u> No _____ Depth (inches): <u>8</u> Saturation present? Yes <u>X</u> No _____ Depth (inches): <u>2</u> (includes capillary fringe)	Indicators of wetland hydrology present? <u>Y</u>	
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

Library Lake
Wetland Delineation Report

VEGETATION - Use scientific names of plants

Sampling Point: T2P1 Wetland

Tree Stratum						50/20 Thresholds		
Plot Size (	Absolute % Cover	Dominant Species	Indicator Status	20%	50%		
30)				Tree Stratum	10	25		
1 <u>populus tremuloides</u>	40	Y	FAC	Sapling/Shrub Stratum	2	4		
2 <u>Acer negundo</u>	10	Y	FAC	Herb Stratum	22	54		
3 _____				Woody Vine Stratum	0	0		
4 _____				Dominance Test Worksheet				
5 _____				Number of Dominant Species that are OBL, FACW, or FAC: <u>5</u> (A)				
6 _____				Total Number of Dominant Species Across all Strata: <u>5</u> (B)				
7 _____				Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)				
8 _____				Prevalence Index Worksheet				
9 _____				Total % Cover of:				
10 _____	50	= Total Cover		OBL species <u>7</u> x 1 = <u>7</u>				
				FACW species <u>101</u> x 2 = <u>202</u>				
				FAC species <u>58</u> x 3 = <u>174</u>				
				FACU species <u>0</u> x 4 = <u>0</u>				
				UPL species <u>0</u> x 5 = <u>0</u>				
				Column totals <u>166</u> (A) <u>383</u> (B)				
				Prevalence Index = B/A = <u>2.31</u>				
Sapling/Shrub Stratum						Hydrophytic Vegetation Indicators:		
Plot Size (	Absolute % Cover	Dominant Species	Indicator Status	Rapid test for hydrophytic vegetation			
15)				<input checked="" type="checkbox"/> Dominance test is >50%				
1 <u>Rhamnus cathartica</u>	5	Y	FAC	<input checked="" type="checkbox"/> Prevalence index is ≤3.0*				
2 <u>Viburnum dentatum</u>	3	Y	FAC	Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)				
3 _____				Problematic hydrophytic vegetation* (explain)				
4 _____				*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic				
5 _____				Definitions of Vegetation Strata:				
6 _____				Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.				
7 _____				Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.				
8 _____				Herb - All herbaceous (non woody) plants, regardless of size, and woody plants less than 3.28 ft tall.				
9 _____				Woody vines - All woody vines greater than 3.28 ft in height.				
10 _____				Hydrophytic vegetation present? <u>Y</u>				
11 _____								
12 _____								
13 _____								
14 _____								
15 _____								
	8	= Total Cover						
Herb Stratum						Remarks: (Include photo numbers here or on a separate sheet)		
Plot Size (	Absolute % Cover	Dominant Species	Indicator Status				
5)								
1 <u>Phalaris arundinacea</u>	100	Y	FACW					
2 <u>Typha latifolia</u>	5	N	OBL					
3 <u>Carex lacustris</u>	1	N	OBL					
4 <u>Sagittaria latifolia</u>	1	N	OBL					
5 <u>Mertha spicata</u>	1	N	FACW					
6 _____								
7 _____								
8 _____								
9 _____								
10 _____								
11 _____								
12 _____								
13 _____								
14 _____								
15 _____								
	108	= Total Cover						
Woody Vine Stratum								
Plot Size (	Absolute % Cover	Dominant Species	Indicator Status				
)								
1 _____								
2 _____								
3 _____								
4 _____								
5 _____								
	0	= Total Cover						

APPENDIX D: PHOTOS



Wetland Soil Profile



Educational Sign in Adjacent Uplands.

APPENDIX E: CLIMATOLOGY DATA

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:	
county: Barron	township number: 35N
township name: Cumberland	range number: 13W
nearest community: Cumberland	section number: 6

Aerial photograph or site visit date:
Wednesday, June 16th, 2015

Score using 1971-2000 normal period

(values are in inches)	first prior month: June 2015	second prior month: May 2015	third prior month: April 2015
estimated precipitation total for this location:	4.10	4.10	2.08
there is a 30% chance this location will have less than: *	2.98	2.39	1.22
there is a 30% chance this location will have more than: *	4.73	3.80	2.74
type of month: dry normal wet	normal	wet	normal
monthly score	2 * 3 = 6	3 * 2 = 6	2 * 1 = 2
multi-month score:			
6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			14 (normal)

Score using 1981-2010 normal period

(values are in inches)	first prior month: June 2015	second prior month: May 2015	third prior month: April 2015
estimated precipitation total for this location:	4.10	4.10	2.08
there is a 30% chance this location will have less than: *	2.86	2.48	1.45
there is a 30% chance this location will have more than: *	4.70	4.17	3.17
type of month: dry normal wet	normal	normal	normal
monthly score	2 * 3 = 6	2 * 2 = 4	2 * 1 = 2
multi-month score:			
6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			12 (normal)